Evaluating Website Quality: Applying Cue Utilization Theory to WebQual

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Abstract

Cue Utilization Theory is applied to examine the relative importance of each of the WebQual dimensions (Informational Fit-to-Task, Tailored Information, Trust, Response Time, Ease of Understanding, Intuitive Operations, Visual Appeal, Innovativeness, Emotional Appeal, Consistent Image, On-line Completeness, and Relative Advantage) in determining consumers’ evaluation of website quality. Two studies have been designed for this task. Study 1 qualifies how subjects rate the predictive value (PV) and confidence value (CV) of each dimension. An analysis of these results provides an ability to fit the WebQual dimensions to a 2x2 model showing the relative magnitude that each dimension has on consumers’ evaluation of website quality. Study 2 is designed to test the viability of the model via a set of proposed hypotheses. The results from this research will contribute to the field by providing a model that developers can utilize to focus on those characteristics most deterministic of overall website quality.

1. Introduction

In the last ten years, online shopping has become a prevalent part of the average consumer’s shopping experience. The consumer now has the ability to purchase virtually anything online; ranging from small-ticket items such as a rubber-band ball to big-ticket items like vacation homes. With this increase in the online consumer’s purchasing power and propensity to purchase online, retailers have become increasingly willing to develop their e-commerce presence. Moreover, this explosion of Internet activity has prompted businesses to demand that website developers understand the qualities of a website that serve to facilitate the shopping experience for e-commerce consumers. At the same time, this growth of e-commerce has provided a virtual plethora of new options for crimes of opportunity such as identity theft.

The online shopper has to worry not only about finding a desirable product, but they also have to evaluate the website to determine if they are willing to make a purchase from this site.

Valacich, Parboteeah and Wells [1] developed the Online Consumer’s Hierarchy of Needs to delineate the needs of the online consumer. Their model showed that certain fundamental needs exist that the online consumer must have met before they are willing to utilize a website. These fundamental needs are then further broken down into the specific website characteristic categories of Functional Convenience, Representational Delight and Structural Firmness. Functional Convenience is the category allowing the consumer to accomplish the task-at-hand easily and includes attributes, such as ease of ordering and tracking. Representational Delight is characterized by those dimensions that make the site visually appealing, such as graphics and sizing. Structural Firmness consists of fundamental qualities such as response time and security. For instance, using this Hierarchy of Needs, a consumer interested in online banking would need to have their basic need for each of these characteristics met before they would be willing to use the website.

This Hierarchy of Needs model shows those characteristics that are necessary for a consumer to utilize a website, and further elaborates by showing which characteristics are most important depending on if the consumer is visiting the website for business, pleasure or a combination of the two [1]. Knowing these characteristics is important for development of the website, but also implies that consumer perceptions of these characteristics may manifest as informational cues that are used to make an assessment of overall website quality. Traditional marketing literature suggests that when people make assessments of quality, they tend to use informational cues that are not only predictive, but also easy to assess. This is known as the Cue Utilization Theory [2], and has been paramount in evaluating consumers’ perceptions of product quality.
This article seeks to answer the question, which informational cues (i.e., website characteristics) are the most influential when consumers make an evaluation of overall website quality? Specifically, how do consumers perceptions of the value of informational cues and their confidence in rating informational cues influence their perception of a website’s quality. To answer this question a model is developed using Cue Utilization Theory [2] and WebQual [3] to show the attributes of a website that are the most determinant of how a consumer will react to the website. This model will provide a deeper understanding of the evaluation of existing and proposed websites with respect to consumers’ confidence in evaluating the cues communicated by the website.

2. Cue Utilization Theory

Richardson, Dick and Jain [2] employed Cue Utilization Theory in their research to determine how consumers viewed store brand quality vs. nationally branded merchandise. According to this theory, “… products consist of an array of cues that serve as surrogate indicators of quality to shoppers” [2]. This theory purports that cues are evoked by the two separate dimensions of predictive and confidence values. The predictive value (PV) is “… the degree to which consumers associate a given cue with product quality” [2]. Confidence value (CV) is “… the degree to which consumers have confidence in their ability to use and judge that cue accurately” [2].

Further, based on relative differences in PV and CV, cues can be broken down into the distinct areas of extrinsic and intrinsic. Extrinsic attributes are those attributes that relate to the focal object but are not an inherent part of the object [2,4]. Intrinsic attributes are those attributes that are inherent to the composition of the focal object and cannot be changed without also fundamentally altering the composition of the object [2,4]. From these definitions, an intrinsic attribute would be one that would fundamentally alter the focal object (e.g., product) if it was changed or absent and, per Cue Utilization Theory, would possess an inherently high degree of PV. Alternatively, an extrinsic attribute would be one that would not alter the fundamental nature of the focal object in its absence but might alter a consumer’s reaction or perceptions of the object. Per Cue Utilization theory, an extrinsic cue would typically have higher degrees of CV compared to PV.

For example, when looking at a video card on an e-commerce website it could be said that the product price is an example of an extrinsic attribute of the video card. While the video card’s dimensions and material composition of the video card serve as intrinsic indicators. Further, you could postulate that the average consumer has a higher CV in their ability to judge the quality of the card based on the price rather than the material composition. Though the consumer knows that the dimensions and material composition of the card are important, they will tend to rely on price as an informational cue, as that is the cue that they feel the most comfortable evaluating.

When considering the quality of a website there are a myriad of dimensions that the consumer must evaluate to determine if they intend to perform a transaction on this website. From the Valacich et al [1] article the consumer’s basic needs in terms of Structural Firmness, Functional Convenience and Representational Delight must all be met before the consumer will consider doing business. To determine if these needs are being met the consumer will evaluate the cues they perceive as being exhibited from the website. These cues can be further broken down into components by utilizing the WebQual model [3].

3. WebQual

WebQual consists of 12 dimensions: Informational Fit-to-Task, Tailored Information, Trust, Response Time, Ease of Understanding, Intuitive Operations, Visual Appeal, Innovativeness, Emotional Appeal, Consistent Image, On-line Completeness, and Relative Advantage. Each of these dimensions is shown to have strong measurement validity in regards to the consumer’s evaluation of overall website quality [3].

Information fit-to-task is an amalgamation of information quality and functional fit-to-task [3]. In component form, information quality refers to the data’s appropriateness for use or ability to meet the users’ needs [5]. Functional Fit-to-Task can be represented as the degree the technology assists the user at a given task [6]. Drawing these two components back together as a whole and relating them to cyberspace lends credence to the definition that information fit-to-task is assisting the user in their desired task by presenting relevant/appropriate information. Loiacono, Chen, and Goodhue [7] define this as “the information provided meets task needs and improves performance”.

The ability for consumers to tailor the information displayed on a website to meet their needs is the basic form of Tailored Information. Tailored Information is further characterized by Ghose and Dou [8] as the interactivity of the website, and represents the consumers’ ability to modify information presented on the website. Recent research suggests that website interactivity will lead consumers to be more positive in their evaluation of websites [8]. This concept has also been operationalized as the ability to personalize...
information between the consumer and the website [7,9]

**Trust**, in relation to websites, is defined in an extremely simple form as consumers’ confidence that any information entered into the website will remain confidential and that said information will be transmitted and stored in a secure fashion [7]. Furthermore, trust is having faith that the information presented on the website is true and accurate [10,11]. Lack of Trust has been cited as one of the main hindrances to completion of e-commerce transactions [12,10,13].

**Response Time** (aka. download time or download delay) is defined by Rose and Straub [14] as “… the time it takes for a web client to fully receive, process, and display files” (p. 56), and is ranked as one of the largest impediments to electronic commerce in their research. Additional research has reinforced that Response Time can be an impediment to e-Commerce, and that it is also strongly associated with web site success [15,16].

The consumers ease in comprehending the website is the **Ease of Understanding**. Loiacono et al. [7] describe this in terms of a website’s ease of reading and the understandability of said website. This would include things like presenting the information in a manner which is easy for the consumer to assimilate, and in a fashion such that the consumer can quickly navigate to the desired information.

**Intuitive Operations** deals with the usability of a website, and includes items such as navigability, link placement, operation, and changing the color of visited links [17]. Intuitive Operations could be thought of as making the webpage easy to navigate, and providing intuitive options for available tasks [7].

**Visual Appeal** is how aesthetically pleasing the website is to the consumer. Determining what is aesthetically pleasing is complicated though; it ranges from the overall complexity of the website [18] and the layout of the interface [19] to how many ads and graphics are appropriate on a given page [20].

**Innovativeness** is “The creativity and uniqueness of a site design” [7]. This could include concepts such as a website having a new way of presenting its merchandise (e.g. Woot.com) or a website attempting to tailor the information to consumer preferences (e.g. Amazon.com)

**Emotional Appeal** can be elicited in many forms and can be thought of as the consumers’ intensity of involvement given the emotions that the website elicits [7]. This is often seen in the form of testimonials presented on the website, but can also be observed by simple things such as a consumer’s reaction to a Valentine’s Day card.

Loiacono et al. [7] articulate **Consistent Image** as the website’s ability to project a company image that is compatible with the company image shown in other forms of media channels. For instance, a traditional brick-and-mortar store would want to ensure that their website was displaying a compatible image so that they could capitalize on synergies created by marketing in multiple channels such as cost savings, market extension and improved Trust [21].

Presenting all the information required for the tasks that the website is designed for would be considered **On-line Completeness.** This would include tasks such as the ability to complete an online transaction on e-commerce sites. A bank for instance would want ubiquitous account access using all available channels, and the information presented in each of these channels has to be on the same update cycle as to present the customer the same information regardless of channel [5].

**Relative Advantage** is gaining a competitive advantage by being able to do something better than the competition. This could come in the form of providing better interaction with the customer through the website [7], being able to provide more accurate and timely data through your website than the competition [5] or being able to price products lower than the competition because of reduced prices in your supply chain.
Each of these dimensions is then tied back into the consumer’s intention to use/reuse the site. Trust and Response Time, being key indicators, are directly linked to the consumer’s intention to use the site. Common sense would tell us that consumers are not going to shop on a site that does not respond rapidly to requests. Likewise, if users’ don’t trust the site to keep their information secure, they are not likely to supply the information in the first place. The remaining dimensions are all fully mediated by Usefulness, Ease of Use and Entertainment. Usefulness mediates Informational Fit-to-Task, Tailored Information, Online Completeness and Relative Advantage. Additionally, Ease of Use is partially mediated by Usefulness. Ease of Use mediates Ease of Understanding and Intuitive Operations. Finally, Entertainment mediates Visual Appeal, Innovativeness, Emotional Appeal and Consistent Image (See WebQual model in Figure 1) [3].

Consumers do not just browse a site and evaluate each of these individual traits though. Consumers instead tend to examine a website using those cues that they feel confident in their ability to evaluate successfully. To understand this issue further, WebQual needs to be combined with Cue Utilization Theory to explain the extrinsic/intrinsic nature of each of these dimensions.

4. Cue Utilization/WebQual Conceptual Model

As Valacich et al [1] point out; consumers must have their basic level of needs met before any of the other elements of the website can become relevant to the consumers’ experience. To validate that these basic needs have been met, the consumer will evaluate those features that they believe to be highly predictive of the quality of the website. This evaluation will then be indicative of their willingness to continue to use the website.

Both extrinsic and intrinsic cues serve a function in the consumer’s overall evaluation of the quality of a website, which means that such cues possess varying degrees of PV and CV. Literature has shown that consumers tend to use a combination of both extrinsic and intrinsic cues when evaluating the quality of a product [2]. An argument can be made about the extrinsic versus intrinsic nature of each of the dimensions in the WebQual model.

Intrinsic cues are those cues that are inherent to a website. Conceptually they are the cues that when changed fundamentally alter a characteristic of the website (e.g. Visual Appeal). Consumers tend to see these cues as being highly predictive of quality [2]. At the same time, consumers may or may not have a high degree of confidence in their ability to evaluate these intrinsic cues because these cues are often difficult to differentiate. Thus, assuming a Cue Utilization Theory perspective, a website characteristic that is perceived to be an intrinsic cue would have an inherently high degree of PV. Yet, the power of an intrinsic cue for assessments of quality will depend on the CV of the cue, with higher levels of CV being optimal.

Extrinsic cues are those cues that are used to evaluate a website but are not an inherent part of the website (e.g. Response Time). Consumers tend to have a lot of confidence in their ability to evaluate these cues in regards to assessment of quality [2]. On the other hand, consumers typically do not rate these cues as being highly predictive (as compared to intrinsic cues) of the overall quality of the website. Considering extrinsic cues from a Cue Utilization Theory perspective, a website characteristic that is perceived to be an extrinsic cue would have an inherently high degree of CV.

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<thead>
<tr>
<th>Predictive Value</th>
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<td>High</td>
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<td>High</td>
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Shown in Table 1 is a 2x2 matrix representing how each of the combinations of CV and PV will influence consumers’ willingness to perform tasks on a given website. Characteristics with high CV and high PV are believed to have the largest effect on consumers’ perceptions of website quality. Those with low CV and PV would have a small to none existent effect, and those high on one dimension but low on the other would have a moderate effect. Next, we will posit about how varying degrees of cue PVs and CVs, respectively, will affect consumer perceptions of overall website quality.

Relative Advantage is often considered an important aspect of websites as discussed previously. However, from a Cue Utilization Theory perspective the consumer may experience, at most, only a vague feeling about the Relative Advantage of the website. As such they would not place much value in their confidence in assessing this characteristic, which
would result in a low CV. Along the same lines the average consumer would also not really take Relative Advantage into consideration when they were performing tasks, implying a relatively low level of PV. Thus, website characteristics that fall into the quadrant in the model with low levels of both PV and CV would have a small impact on consumers’ willingness to perform tasks on a website.

**H1:** A website characteristic with low CV & low PV will produce a small to none existent effect on the consumers’ perception of website quality.

A characteristic such as Trust is highly predictive of consumers’ willingness to use a website, but the average consumer may not have much confidence in their ability to evaluate this characteristic. Trust in an online medium has been shown to be an attribute that is hard for the consumer to evaluate and in some cases to even define [10]. Cue Utilization Theory suggests that though this characteristic is highly predictive of website quality, consumers’ lack of confidence in evaluating the characteristic may inhibit their ability to use the characteristic to assess the quality of the website. Moreover, dimensions in this quadrant, high PV/Low CV, have been shown to be relatively intrinsic to the website [2], and will have a moderate effect on the consumers’ evaluation of the website’s quality.

**H2a:** A website characteristic with low CV & high PV will produce a moderate effect on consumers’ perception of website quality.

One could reason that Response Time is a good example of an extrinsic attribute because it is not part of the inherent composition of the website. Rather, Response Time could be considered extrinsic because it can vary without changing anything about the content of the website. Rose and Straub [14] have shown in their research that consumers tend to attribute lack of responsiveness to extrinsic factors such as the overall speed of the internet, their own internet connection being slow, or other factors. In general, consumers seem to be willing to give the website the benefit of the doubt when slow response times are encountered, and as such, Response Time could be considered extrinsic to the website because it doesn’t fundamentally change the consumer’s perception of the website when it is altered. Based on Cue Utilization theory attributes with a low PV and high CV (such as Response Time) will only have a moderate influence on the consumers’ evaluations of website quality, and those dimensions belonging to this quadrant would be extrinsic to the website [2].

**H2b:** A website characteristic with high CV & low PV will produce a moderate effect on consumers’ perception of website quality.

Cue Utilization Theory suggests that those characteristics with High CV and PV are the most highly predictive of consumers’ perception of website quality. Visual Appeal could be considered an intrinsic attribute because it is a characteristic inherent to the website that consumers are confident in using to evaluate website quality. One could further speculate that Visual Appeal is intrinsic to the website because if the Visual Appeal of the website was changed it would alter the inherent nature of the website. Lindgaard, Fernandes, Dudek, and Brown [22] have shown in their research that consumers form opinions about websites within the first 50 milliseconds (ms) of exposure. Furthermore, this initial perception of websites is almost entirely based on Visual Appeal; this was shown by correlating the ratings between 50 ms and 500 ms. However, though this attribute is intrinsic it shows an optimally high level of CV and PV thus placing it firmly into the high impact quadrant. Dimensions in this quadrant would exhibit the optimal balance between PV and CV (i.e., an optimal intrinsic cue), and as such this quadrant of the table is hypothesized to have the largest impact on the consumers’ evaluation of the website’s quality.

**H3:** A website characteristic with high CV & high PV will produce the largest effect on consumers’ perception of website quality.

5. Research Method

To test these hypotheses two empirical studies will be administered. Study 1 is designed to determine where each of the WebQual dimensions fit into the 2x2 model shown in Table 1. Furthermore, this study is designed to determine if a significant difference can be perceived to exist between each of the dimensions when rank ordered by PV and CV. Study 2 will test the hypotheses by collecting data on each of these dimensions using a sample website, and comparing actual results to those found in the first study.

5.1 Study 1

This study will focus on determining the CV and PV for each of the 12 dimensions of website quality, and determining if there is a significant difference between adjacent dimensions when rank ordered.
5.1.1 Subjects. Approximately 500 subjects will be recruited from an introductory Information Systems class held on campus at a large Northwestern University. All data for Study 1 will be collected during the fall of 2009. Subjects will be given course credit for completing the survey, and no other incentives will be provided.

5.1.2 Survey Procedure. The survey is broken into two sections, one for CV and one for PV. In the CV section subjects are asked to rank order each of the 12 WebQual dimensions with respect to how confident they are in evaluating each dimension as it relates to overall website quality. The second section is designed to measure the PV of each of the 12 dimensions. Subjects are again asked to rank order each of the 12 dimensions; however, this time they are instructed to rank order them with respect to how predictive of website quality the subject believes each dimension to be.

5.1.3 Data Analysis. Aggregating the results of this data collection will allow each of the dimensions to be mapped to a CV and PV scale. Based on the relative PV and CV scores, each of the dimensions will be integrated into the 2x2 matrix shown in Table 1. Furthermore, the relative magnitude of each dimension will indicate the relative effect each dimension will have on the overall rating of website quality.

5.2 Study 2

This study will utilize subjects from an introductory Information Systems class taught in the fall of 2009. Approximately 500 students will participate. This study will focus on first determining the overall quality attributed to a website by the subjects, and secondly how the subjects rate each of the twelve WebQual dimensions for each website. Using regression analysis, we should then be able to show that the model accurately predicts the website quality based on the rating of each of the 12 dimensions.

Furthermore, the pattern of results from this study will examine how well the WebQual dimensions fit to the quadrant they were assigned in Study 1, and that the model developed in Study 1 is predictive of the responses received in Study 2. Those dimensions that serve as the highest-level indicators of website quality should be rated the highest by the subjects, and those that are the lowest should be rated likewise. Ideally, this study should provide significant support for each of the proposed hypotheses, and indicate which of the dimensions should be of highest consideration when constructing a high quality website.

6. Discussion and Potential Contribution

As shown in the model, the most important considerations when developing a website are those attributes that reside in the high CV and high PV quadrant. Online businesses should pay particular attention to the characteristics in this quadrant, as the consumer will tend to utilize these dimensions the most when determining the overall quality of the website. All businesses seeking to perform transactions within the e-commerce channel should pay heed to these recommendations, but online retailers need to pay particular attention, as this is the primary channel through which they produce revenue.

Of secondary importance to consumers are the Low CV/High PV and High CV/Low PV quadrants. If an online business seeks to capitalize on one of the dimensions within these quadrants, they need to pay particular attention to how they will nudge the consumer into using these dimensions for evaluation of website quality. This could potentially be accomplished through educational campaigns or marketing literature. Finally, the low CV/Low PV quadrant is of limited value to the online retailer, and should be removed from consideration when developing a website.

This article seeks to contribute to the field by providing a model that can be used to enable web developers to effectively predict the overall quality of a website based on its design. In following this model, the developer will need to pay particular attention to those attributes that are highly predictive, from the consumer’s viewpoint, of overall website quality, and as such, the website should be designed in a fashion that encourages the consumer to conduct transactions. Additionally, the consumer will be motivated to perform future transactions from this website because they are familiar with the layout and possess a high confidence in the overall quality of the website.

7. Limitations and Future Research

The primary limitation of this model is that it is an untested conceptual model. The assumptions contained herein are as of yet ungrounded in solid empirical evidence; furthermore, this model was designed around e-commerce websites designed to sell products to end consumers.

Future research could delve into decomposing those elements that are the most highly predictive of website quality. This research could take each
dimension and decompose them to their base elements to discover what it is about the dimension that makes it highly predictive of website quality. Additionally, the extrinsic/intrinsic nature of each of the dimensions could be explored to determine how a company can best capitalize on these dimensions when trying to sell the consumer on the quality of their website. Either of these approaches could prove invaluable to the field, as they will begin to give the developer a specific set of principles to follow when developing a high quality website.

8. Conclusion

Cue Utilization Theory is a concept that has been used in marketing for years to determine why consumers react differently to a given product. The research offered in this paper has sought to integrate Cue Utilization Theory with the WebQual instrument to design a model that explains which website dimensions are most predictive of overall website quality. Using this model, website designers will be able to build websites that are more easily assessed by the consumer in terms of overall website quality, which will in turn promote consumer confidence in performing transactions on the websites.

9. References